Astrophysics and Geophysics

Radioactivity in Supernova Remnants

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ABSTRACT

The mechanics of stellar nucleosynthesis have become a highly developed science, yet many key details still remain unknown. A direct method for tracing elemental abundance created through supernovae involves the measure of X-ray flux from radioactive isotopes formed in a supernovae explosion. In this case, Chandra X-ray Observatory data was used to measure the fluxes from ^{59}Ni and ^{44}Ti, in the Tycho supernova remnant (SNR) and the Cas A SNR, respectively. Using CIAO data analysis software, upper limits for the flux of the 6.90 keV ^{59}Ni line and 4.09 keV ^{44}Ti were found at $-4.4+/-4.6 \times 10^{-6}$ and $4.6+/-2.7 \times 10^{-5}$ photons/cm^2/s respectively. These small fluxes correspond well to theoretical values and can be used to justify further studies with increased exposure time and sensitivity.